

Application No.: 10/564,817
Amendment under 37 CFR 1.111
Reply to Office Action dated February 4, 2009
May 4, 2009

AMENDMENTS TO THE DRAWINGS

In Fig. 4, the term "1 Sectors" has been amended to "1 Sector". Therefore, please replace the attached drawing sheet for the original drawing sheet including Fig. 4.

Attachments: Replacement Drawing Sheet for Fig. 4

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REMARKS

By this amendment, the specification has been editorially amended, Fig. 4 has been amended and claims 1-15 have been amended in the application. Currently, claims 1-15 are pending in the application.

The Fig. 4 drawing was objected because the Examiner stated that in Fig. 4, the term "1 Sectors" should be changed to "1 Sector". By this amendment, the term "1 Sectors" has been amended to "1 Sector" in Fig. 4 as the Examiner suggested. Therefore, it is respectfully submitted that this objection should be withdrawn.

The specification was objected because of the following informalities: In point a) the Examiner stated that the abstract of the disclosure was objected to because in line 5, "to retrieve an free area" should be changed to "to retrieve a free area". By this amendment, the phrase "to retrieve an free area" in the abstract has been amended to "to retrieve a free area" as the Examiner suggested.

In point b) the Examiner stated that on page 3, line 12, "retrieving an free area" should be changed to "retrieving a free area". By this amendment, the phrase "retrieving an free area" on

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page, line 12 has been amended to "retrieving a free area" as the Examiner suggested.

In point c) the Examiner stated that on page 4, lines 17-23, "processor accesses to area management" should be changed to "processor accesses area management, and "a processor which accesses to an information" should be changed to "a processor which accesses an information". By this amendment, on page 4, lines 17-23, the phrase "processor accesses to area management" has been amended to "processor accesses area management, and the phrase "a processor which accesses to an information" has been amended to "a processor which accesses an information" as the Examiner suggested. Therefore, it is respectfully submitted that these objections should be withdrawn.

Claims 1-15 were objected to because of the following informalities: In point a) the Examiner stated that in claim 1, line 6, it appeared that "processor accesses to area management" should be changed to "processor accesses area management". By this amendment, the phrase "processor accesses to area management" in claim 1 has been amended to "processor accesses area management".

In point b) the Examiner stated that in claim 2, line 5, it appeared that "retrieving an free area" should be changed to "retrieving a free area". By this amendment, the phrase

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"retrieving an free area" in claim 2 has been amended to
"retrieving a free area" as the Examiner suggested.

In point c) the Examiner stated that in claim 5, line 3, it appeared that "as the access size in accessing to the head" should be changed to "as the access size in accessing the head". By this amendment, the phrase "as the access size in accessing to" in claim 5 has been deleted.

In point d) the Examiner stated that claim 5 appeared not to make sense. By this amendment, claim 5 has been amended to recite "when said information processor accesses the head or end of said area management information, the access size is a size of said area management information in the physical management block determined from physical characteristics of said information recording medium". Applicants respectfully submit that the claimed features of claim 5 are now clear and definite.

In point e) the Examiner stated that in claim 7, line 5, it appeared that "retrieving an free area" should be changed to "retrieving a free area". By this amendment, the phrase "retrieving an free area" in claim 7 has been amended to "retrieving a free area" as the Examiner suggested.

In point f) the Examiner stated that in claim 8, line 11, it appeared that "a second area management information cache" should be changed to "the second area management information cache".

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Applicants respectfully submit that the phrase "a second area management information cache" appears for the first time in claims 1, 6, 7 and 8 so applicants respectfully submit that there is proper antecedent basis provided for this element.

In point g) the Examiner stated that in claim 12, line 2, it appeared that "information processor which accesses to an information" should be changed to "information processor which accesses an information". By this amendment, the phrase "information processor which accesses to an information" in claim 12 has been amended to "information processor which accesses an information" as the Examiner suggested.

In point h) the Examiner stated that in claim 12, line 17, "a file system controller for accessing to the area" should be changed to "a file system controller for accessing the area". By this amendment, the phrase "a file system controller for accessing to the area" in claim 12 has been amended to "a file system controller for accessing the area" as the Examiner suggested.

In point i) the Examiner stated that the phrases "the first access size", "the second size", "said first access size" and "said second access size" in claim 13, lines 4, 5, 7-8, had insufficient antecedent basis. In addition, the Examiner stated that the access size will be interpreted as "the block size of the cache block". By this amendment, claim 13 has been amended to

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recite "said FAT cache has at least one block having a first access size and at least one block having a second access size; and said first access size is a physical management block size determined from physical characteristics of said information recording medium and said second access size is an access unit of said information recording medium".

In point j) the Examiner stated that in claim 15, line 3, "said file system controller accesses to:" should be changed to "said file system controller accesses:". By this amendment, the phrase "said file system controller accesses to:" in claim 15 has been amended to "said file system controller accesses".

In point k) the Examiner stated that in claim 15, line 6, "retrieving an free area" should be changed to "retrieving a free area". By this amendment, the phrase "retrieving an free area" in claim 15 has been amended to "retrieving a free area" as the Examiner suggested. Therefore, it is respectfully submitted that these objections should be withdrawn.

Claims 2-5, 8-11 and 13-15 were rejected under 35 USC 112, second paragraph, as being indefinite. In point l) the Examiner stated that it was not clear what was meant by "the processing content in said information processor is said free area retrieval processing" in claim 3. Also, the Examiner stated that it was not clear what was meant by "the processing content is said link

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destination acquisition processing". By this amendment, claim 3 has been amended to recite "when said information processor executes said free area retrieval processing, a first access size determined from physical characteristics of said information recording medium or a size less than the first access size is used, and when said information processor executes said link destination acquisition processing, a second access size that is an access unit of said information recording medium is used".
Applicants respectfully submit that the claimed features of claim 3 are now clear and definite.

In point m) the Examiner stated that claim 8 experienced the same deficiencies pointed out above with respect to claims 2-5. By this amendment, claim 8 has been amended to recite "when said information processor executes said free area retrieval processing, said information processor uses a first area management information cache having a physical management block size determined from physical characteristics of said information recording medium or less, and when said information processor executes said link destination acquisition processing, said information processor uses a second area management information cache as an access unit of said information recording medium".
Applicants respectfully submit that the claimed features of claim 8 are now clear and definite.

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In point n) the Examiner stated that in claim 4, it was unclear how "the access size to said area management information" could be "in said free area retrieval processing". By this amendment, claim 4 has been amended to recite "as the access size to said area management information at said free area retrieval processing, said information processor uses a physical management block size determined from physical characteristics of said information recording medium when access to a location other than a head or end of said area management information is performed, and said information processor uses a size equal to or less than said physical management block size when access to the head or end of said area management information is performed".

Applicants respectfully submit that the claimed features of claim 4 are now clear and definite.

In point o) the Examiner stated that claim 5 appeared not to make sense. As discussed above, by this amendment, claim 5 has been amended to recite "when said information processor accesses the head or end of said area management information, the access size is a size of said area management information in the physical management block determined from physical characteristics of said information recording medium".

Applicants respectfully submit that the claimed features of claim 5 are now clear and definite.

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In point p) the Examiner stated that in claim 8, it was unclear that the term "the size" was referring to "physical management block size" recited in claim 8 or "access size" recited in claim 6. By this amendment, claim 8 has been amended to recite "said information processor uses a first area management information cache having a physical management block size determined from physical characteristics of said information recording medium or less". Applicants respectfully submit that the claimed features of claim 8 are now clear and definite.

In point q) the Examiner stated that claim 13 recites "said FAT cache has each of one or more blocks of two types of blocks of a block ...". It was unclear whether, in the case of only one block, that one block will have a first access size and a second access size associated with it, or whether to have a first access size and a second access size, it was required more than one block. By this amendment, claim 13 has been amended to recite "said FAT cache has at least one block having a first access size and at least one block having a second access size". Applicants respectfully submit that the claimed features of claim 13 are now clear and definite.

In point r) the Examiner stated that it was unclear whether "the size in claim 14 was referring to the "size of each block" recited in claim 12 or "the first access size" or "the second

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access size" recited in claim 13. By this amendment, claim 14 has been amended to recite "said FAT cache controller reads data having a size equal to or less than said physical management block size from the information recording medium and retains the read data". It is respectfully submitted that this rejection has been overcome by these amendments and it should be withdrawn.

Claims 1-5 and 12-15 were rejected under 35 USC 102(e) as being anticipated by Ohbi et al. (U.S. Patent Application Publication No. 2004/0047602). Also, claims 6-11 were rejected under 35 USC 103(a) as being obvious over Ohbi in view of Pfister et al. (U.S. Patent Application Publication No. 2003/0033487).

These rejections are respectfully traversed in view of the remarks below.

The present invention relates to a data area managing method of managing data stored in an information recording medium according to a file system and an information processor employing the data area managing method (see page 1, lines 6-9 of the specification).

In Fig. 1, an information processor 100A includes a CPU 101, a main memory 102, a cache memory 103A, an access controller 104 and a program storage section 105 (see page 7, lines 5-8 of the specification).

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The cache memory 103A includes a FAT cache for caching the FAT. To manage the FAT cache, the main memory 102 stores FAT cache management information therein. The program storage section 105 has an application program 106, file system controller 107, and FAT cache controller 108 (see page 7, lines 17-21 of the specification).

An information recording medium 110 has a management information area which stores area management information as file system management information therein and a data area which stores data therein. The management information area is provided with a master boot record and partition table (MBRPT) 111, a partition boot sector (PBS) 112, a FAT 113 and a route directory entry (RDE) 114 (see page 8, lines 6-13 of the specification).

A data area 115 is managed and divided into a plurality of clusters and each cluster stores the data contained in the file therein (see page 9, lines 2-4 of the specification).

Fig. 4 is an explanation view showing an example of a file system constructed on the information recording medium. The example in Fig. 4 assumes the case where a semiconductor memory is used as the information recording medium.

Fig. 5 is a view showing an example of a FAT cache 501 existing on the cache memory 103A. The FAT cache 501 uses a certain area in the cache memory 103A and is managed by the FAT

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cache controller 108. The FAT cache controller 108 repeats generation and release of a plurality of cache blocks in the cache memory 103A assigned for the FAT cache 501 to retrieve the free area. Furthermore, the FAT cache controller 108 provides the function of acquiring a link destination for the file system controller 107 (see page 16, lines 14-23 of the specification).

As shown in Fig. 6, the free area retrieval processing is performed in response to a file access request issued from the application program 106 to the file system controller 107 in Fig. 1. At that time, the file system controller 107 requests a free area retrieval for the FAT cache controller 108 and the FAT cache controller 108 performs free area retrieval. The FAT cache controller 108 reads the FAT in the FAT cache as appropriate, and returns the cluster number of the acquired free area to the file system controller 107 after retrieving the free area (see page 18, line 18 - page 20, line 2 of the specification).

As shown in Fig. 7, in the acquisition processing, in response to a file access request issued from the application program 106 to the file system controller 107, the file system controller 107 issues a link destination acquisition request to the FAT cache controller 108. Then, the FAT cache controller 108 performs the link destination acquisition processing. The FAT cache controller 108 reads the FAT in the FAT cache as

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appropriate, and returns the cluster number of the acquired destination to be linked to the file system controller 107 after acquiring a destination to be linked (see page 23, line 20 - page 24, line 5 of the specification).

In the link destination acquisition processing, the access controller 104 accesses to the FAT in units of sectors and reads the FAT into the FAT cache. In the link destination acquisition processing, since it is referring only to a specific entry of the FAT that enables acquisition of the link destination, the link destination can be rapidly acquired by access in units of sectors as the minimum access unit to the information recording medium.

In the present invention, by changing the access size of the FAT according to the processing steps, the efficiency of the FAT access can be improved. That is, in the free area retrieval processing, by performing access in units of erase blocks, the overhead for reading the FAT can be lessened, thereby shortening the worst time necessary for the free area retrieval processing can be achieved. In acquisition processing, by performing access in units of sectors, the time necessary for one link destination acquisition processing can be shortened (see page 25, line 23 - page 26, line 16 of the specification).

Independent claim 1 recites "when said information processor accesses area management information that manages a free area

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state and link state of the information recording area in said information recording medium, access size is changed according to processing executed by said information processor".

Also, independent claim 12 recites "a FAT cache for reading and storing area management information which manages a free state and link state of said information recording area from said information recording medium; a volatile memory for holding data including: a start address of each block, location of the area management information stored in each block on said information recording medium, size of each block, and presence or absence of update, as FAT cache management information for managing said FAT cache by dividing said FAT cache into a plurality of blocks; a FAT cache controller for referring to and updating said FAT cache management information and controlling a read and change of said area management information to said FAT cache; and a file system controller for accessing the area management information through said FAT cache controller and storing data in the information recording medium as a file". These features are not shown or suggested by Ohbi et al., Pfister et al. or any combination of these references.

Ohbi et al. relate to a recording medium suitably for use in a variety of uses and a recording apparatus, a reproducing apparatus, a recording method, and a reproducing method which

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corresponds to the recording medium (see page 1, paragraph [0001]).

Ohbi et al. disclose that in Fig. 7, the example shows that parts (03h), (18h), (1Fh), (2Bh), and (E3h) are free areas and this status is represented by pointer P-FRA by the link of part tables (03h), (18h), (1Fh), (2Bh), and (E3h). It should be noted that the above-mentioned defective areas and unused part tables are also managed in this manner (see page 8, paragraph [0176]).

Ohbi et al. also disclose that for example, these FAT clusters #0 through #55 store a FAT file system configured by FAT and data files managed by FAT (see page 10, paragraph [0257]).

Ohbi et al. also disclose that it should be noted that the handling of data in the FAT file system is performed on a FAT sector basis on the computer. However, a rewriting operation on the disk is performed on a high-density data cluster basis, so that in the case of the rewriting of one particular FAT sector, the rewriting on the disk is performed in a unit of the high-density data cluster in which this FAT sector is included (see page 10, paragraph [0258]).

Ohbi et al. do not disclose that when the information processor accesses area management information that manages a free area state and link state of the information recording area in the information recording medium, access size is changed

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according to processing executed by the information processor as claimed in independent claim 1.

Ohbi et al. also do not disclose that a FAT cache for reading and storing area management information which manages a free state and link state of the information recording area from the information recording medium; a volatile memory for holding data including: a start address of each block, location of the area management information stored in each block on the information recording medium, size of each block, and presence or absence of update, as FAT cache management information for managing the FAT cache by dividing the FAT cache into a plurality of blocks; a FAT cache controller for referring to and updating the FAT cache management information and controlling a read and change of the area management information to said FAT cache; and a file system controller for accessing the area management information through the FAT cache controller and storing data in the information recording medium as a file as claimed independent claim 12.

Applicants respectfully submit that the description of Ohbi et al. do not disclose the claimed features of the present invention. Specifically, the area management information in the present invention manages a free area state and a data link state. On the other hand, the paragraph [0176] of Ohbi et al.

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shows that the information in Fig. 7 relates to the free area state.

Furthermore, the presently claimed invention discloses that when accessing the information, the access size has changed corresponding to a free area retrieval processing process and a link destination acquisition processing process. On the other hand, the paragraphs [0257] and [0258] of Ohbi et al. do not disclose such functions.

In addition, the controller 3 of Ohbi controls receiving and transmitting reproduced data and data to be recorded, and the controller 3 of Ohbi does not control the FAT caches as claimed in claim 12.

For these reasons, it is believed that Ohbi et al. do not show or suggest the present claimed features of the present invention. Applicants also submit that Pfister et al. do not make up for the deficiencies in Ohbi et al.

Pfister et al. relate to an apparatus and method for maintaining the correctness of data that has been cached or locally copied in a distributed computing system having a number of separate computing nodes (see page 1, paragraph [0002]).

Pfister et al. disclose nodes 1200 and 1202 and a node 1204 with a lock table. Each node 1200 or 1202 has one cache,

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respectively. The lock table is used for blocking unwanted access.

Pfister et al. do not disclose that when the information processor accesses area management information that manages a free area state and a link state of the information recording area in the information recording medium, the access size is changed according to processing executed by the information processor as claimed in independent claim 1.

Pfister et al. also do not disclose that a FAT cache for reading and storing area management information which manages a free state and link state of the information recording area from the information recording medium; a volatile memory for holding data including: a start address of each block, location of the area management information stored in each block on the information recording medium, size of each block, and presence or absence of update, as FAT cache management information for managing the FAT cache by dividing the FAT cache into a plurality of blocks; a FAT cache controller for referring to and updating the FAT cache management information and controlling a read and change of the area management information to said FAT cache; and a file system controller for accessing the area management information through the FAT cache controller and storing data in

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the information recording medium as a file as claimed independent claim 12.

It is therefore respectfully submitted that Ohbi et al. and Pfister et al., individually or in combination, do not teach, disclose or suggest the presently claimed invention and it would not have been obvious to one of ordinary skill in the art to combine these references to render the present claims obvious.

Ohbi et al. and Pfister et al. also do not disclose many features of dependent claims 2-11 and 13-15.

For example, Ohbi et al. and Pfister et al. do not disclose a free area retrieval processing for retrieving a free area from said area management information; and a link destination acquisition processing for acquiring a destination to be linked from said area management information as claimed in dependent claim 2. Specifically, the paragraph [0116] of Ohbi does not disclose a free area retrieval processing as claimed in claim 2. Also, the paragraph [0165] of Ohbi does not disclose a link destination acquisition processing as claimed in claim 2.

Also, Ohbi et al. and Pfister et al. do not disclose that two caches each having a different management block size are provided as area management information caches in the information processor, and by alternatively using said two caches for different purposes, the access size is changed according to the

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processing executed by the information processor as claimed in dependent claim 6. Applicants respectfully submit that the structure of Pfister et al. is different from the method as claimed in claim 6.

Therefore, allowance of these dependent claims is also respectfully requested.

In view of foregoing claim amendments and remarks, it is respectfully submitted that the application is now in condition for allowance and an action to this effect is respectfully requested.

If there are any questions or concerns regarding the amendments or these remarks, the Examiner is requested to telephone the undersigned at the telephone number listed below.

Respectfully submitted,


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